

GREEN MANURIAL CROPS AND "TAKE ALL."

Ophiobolus graminis (Sacc.).

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During the past season the disease "Take all" or "White-heads," *Ophiobolus graminis*, Sacc., has developed to a more or less serious extent in all the green manurial plots at the State Research Farm, Werribee.

For a number of years (1913-18) wheat has been used every alternate year in rotation with various green manurial crops. On one half of the plots the green crops have been ploughed in, and on the other half they have been fed off. In each series of plots one section is given up to bare fallow and wheat every other year. During 1918 the plots sown with wheat developed "Take all" badly.

An attempt has been made to ascertain the effect of the various green crops upon the percentage of disease present. It should, however, be clearly understood that the results obtained relate to one season only, and will possibly be far from the actual results when the investigations are carried over a series of years.

What is "Take all."

Some years ago there was some doubt as to the cause of "Take all," but this was cleared up by Mr. D. McAlpine in Bulletin No. 9, "Take all and white-heads in Wheat," issued by the Department of Agriculture, Victoria. In this Bulletin it is clearly shown that the cause is due to the fungus, *Ophiobolus graminis*, Sacc. Of all fungus diseases affecting wheat "Take all" is the most destructive, and the actual loss caused by it is far greater than by any other single disease, Rust included, or perhaps by a combination of all known fungus diseases affecting wheat in Victoria.

Rust when present in epidemic form causes more widespread loss for the one season, but fortunately it appears only once in a series of years, while "Take all" is always with us, destroying a few plants here, thousands there, and nearly the entire crop in other places.

POSSIBLE CONDITIONS FAVOURING "TAKE ALL."

As to conditions favorable to the disease or its control very little is known. In fact, it is not known whether the fungus favours an acid or an alkaline soil, or one rich in organic matter.

In regard to the alkalinity of the soil, some very suggestive facts have been recorded from the Permanent Test Plots, at the Research Farm, Werribee. These plots are twenty in number, and four of them have been dressed with lime in combination with other fertilizers every alternate year since 1913. In each and every plot where lime has been used "Take all" is present to a far greater extent than in any of the others. The manurial treatment of the four plots to which lime was

applied, as well as the percentage of "Take all" present, is shown in the following table:—

Plot.	Treatment.	Percentage of "Take all."
8A	Stable manure, 10 tons; lime, 10 cwt.	50
16A	Superphosphate, 1 cwt.; lime, 5 cwt.	48
17A	Superphosphate, 1 cwt.; lime, 10 cwt.	49
18A	Superphosphate, 1 cwt.; lime, 20 cwt.	49

It would appear, therefore, that an alkaline soil is favorable to the development of the disease, but it should perhaps be again remarked, this judgment is from one year's data only.

Now it is a well-known fact that if wheat follows wheat continuously, the time arrives when the yield does not equal in quantity the seed used. If, however, disease enters in as a factor, this result is attained in a far shorter time, despite careful cultivation.

Unfortunately, through a combination of factors, this stage has been reached in the experimental plots under notice, and at a period earlier than one would expect. Whether the condition will continue remains to be seen.

The following table shows the system of rotation followed in the green manurial plots and the percentage of disease observed in the various wheat crops grown during the 1918 season:—

Plot No.	Crop.	Percentage of "Take all" during the 1918 Season.
11	Wheat after rape ploughed in	15
12	Wheat after barley ploughed in	60
13	Wheat after peas ploughed in	15
14	Wheat after rye and vetches ploughed in	25
15	Wheat after bare fallow	10
16	Wheat after rape fed off	12
17	Wheat after barley fed off	25
18	Wheat after peas fed off	10
19	Wheat after rye and vetches fed off	56
20	Wheat after bare fallow	15

In making a comparison between the plots on which the green crops were ploughed in and those where the crops were fed off, we find that on the average the "fed off" plots have a slightly less percentage of disease present. Further, these latter plots have yielded feed for stock, while the former have required the additional work of ploughing down the green crops. In other words, where the green crop was ploughed in there was more labour necessary, yet there was less grain and less feed; but where the crop was fed off, less labour gave a better result and, in addition, there was more feed for stock.

Individual Plots Compared.

Taking the bare fallow plots, one would at least expect that they would approach each other closely in the number of diseased plants present. Yet one (Plot 20) bore 15 per cent., while another (Plot 15) bore only 10 per cent. of diseased plants. The former plot appears to have been very wet in the early part of the season, and this may have, to some extent, rendered the plants more liable to attack.

Pease ploughed in (Plot 13) gave 15 per cent. "Take all," and pease fed off (Plot 18) 10 per cent. Where pease have been used the disease is less, and the crops better; in fact, the disease was less and the crops slightly better than on the bare fallows.

On the plot where rape was ploughed in (Plot 11), "Take all" equalled 15 per cent., and where rape was fed off (Plot 16) there was 12 per cent. "Take all." A considerable difference in the apparent bulk of the crops was noticeable, Plot 16 having, to all appearances, a far better yield. In my judgment, it was the best crop in the whole series.

Barley ploughed in (Plot 12) gave the highest record of disease of the whole lot, viz., 60 per cent. "Take all." Barley fed off (Plot 17) had 25 per cent. "Take all" present. Even the combined average for the two plots shows the highest record for "Take all" in the whole series. Barley has been recorded in Victoria as the host of *Ophiobolus graminis*, Sacc., and possibly the alternation of wheat and barley for the past six years has in great measure infected the soil. Where the whole plant has been ploughed under, the infection is highest, while, on the other hand, where the barley has been eaten down the disease was 35 per cent. less. Why this is so one cannot say with observations extending over one season only.

Where rye-vetches were ploughed in (Plot 14), "Take all" showed 25 per cent., and rye and vetches fed off (Plot 19), 56 per cent. These plots are not comparable on account of the variation in combination.

So far as one can gather from the one season's observations, pease, either fed off or ploughed in, seem to give the cleanest crop, so far as "Take all" is concerned. Bare fallow follows next in order; and, on the whole, I think that no better system of cultivation has yet been devised than wheat after good, well-worked, clean fallow. If the rotation be wheat alternating with fallow, it is better to burn the stubble of the previous crop. By doing so, a great many fungus diseases are partly killed out, especially "Flag smut," *Urocystis tritici* Koern and "Take all," *Ophiobolus graminis*, Sacc.

HOSTS OF "TAKE ALL."

The hosts upon which the "Take all" fungus has been recorded are—

1. Wheat *Triticum vulgare* Vill.
2. Oats *Avena sativa*. L.
3. Barley *Hordeum vulgare*. L.
4. Barley grass *Hordeum murinum*. L.
5. "Soft Brome" grass *Bromus mollis*. L.
6. "Spear grass" *Bromus sterilis*. L.
7. "Wheat grass" *Agropyron scabrum*. Beauv.

RAINFALL AT WERRIBEE.

Water-logging and drying out of the soil tends to the development of "Take all," and the weather conditions last season were such as to encourage its spread. The rainfall at the State Research Farm for 1918 was as follows:—

			Inches.
January	..	..	.50
February	..	..	.70
March	..	..	3.80
April	..	..	.74
May	..	..	2.12
June	..	..	1.69
July	..	..	1.82
August	..	..	2.90
September	..	..	2.21
October	..	..	2.10
November	..	..	.38
December	..	..	1.00
Total	..	..	19.96

It will therefore be seen that during the wheat-growing period the rainfall was favorable except during the month of November.

CORRECTION.

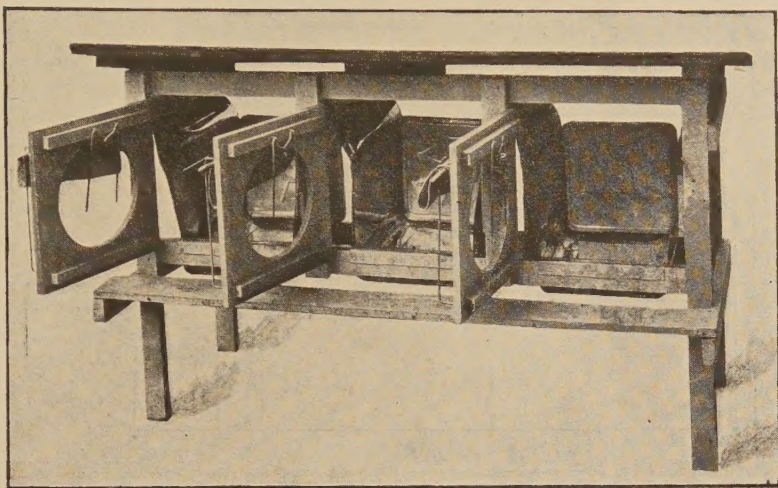
BOTTLING OF FRUIT.

In Miss Knight's article on the Bottling of Fruit for Home Use, published in the *Journal of Agriculture* for December last, in describing an old way of preserving fruit, a passage read (pages 724-5):—

"The fruit should be packed into jars and each filled with cold syrup, and the lid put *tightly* on,"

The use of the word "tightly" was due to a typographical error, and should have been printed *lightly*.

trouble. It has been found that every two hours is sufficient to visit the trap-nests, but it is advisable to place them in the yards in such a position that they can be readily seen by the attendant whilst engaged in his ordinary duties. These trap-nests are invaluable in the breeding pen for the identification of the eggs laid by previously tested hens. The egg can be marked with the hen's number at the time it is laid. It can be hatched separately and the chicken branded; if a cockerel, it will assuredly command a better price coming from a tested hen; if a pullet, it may be tested, and the result should be of value to the breeder in mating his birds during the following year.



Trap Nests—showing interior.

Material Required for Set of Four Trap-Nests.

2-in. x 1-in. Oregon.

- 4 pieces 4 ft. 10 in. long.
- 2 pieces 2 ft. 4 in. long.
- 2 pieces 2 ft. 1 in. long.
- 6 pieces 1 ft. 3 in. long.
- 2 pieces 1 ft. 4 in. long.
- 2 pieces 1 ft. 10 in. long.
- 5 pieces 1 ft. 1½ in. long.
- 3 pieces 1 ft. 11 in. long.

4-in. x ½-in. Rough Lining.

- 7 pieces 5 ft. 3 in. long.
- 1 piece of rubberoid 5 ft. 3 in. x 2 feet.
- 4 kerosene tins.
- 4 trap-nest fronts (Smith's patent).
- 4 pairs 1½-in. butt-hinges.

METHOD OF CONSTRUCTING.

Lay two pieces of the 4-ft. 10-in. on bench 15 inches apart, nail on two pieces of 2-ft. 1-in., one at each end, then nail on three of the 1-ft. 3-in. pieces at equal distances, as in Fig. I.; this will form the

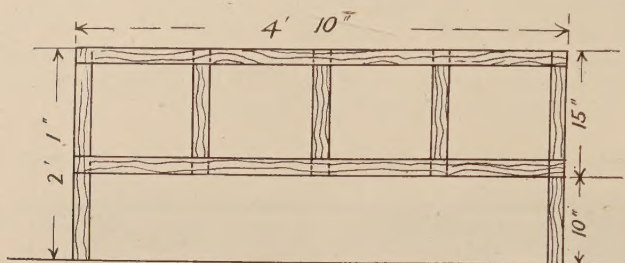


FIG. 1 BACK

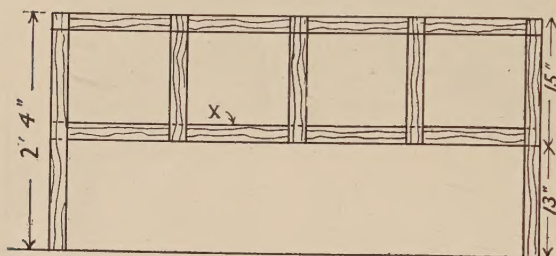


FIG. 2 FRONT

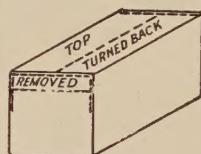
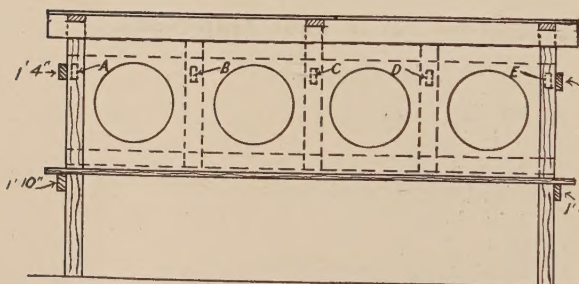
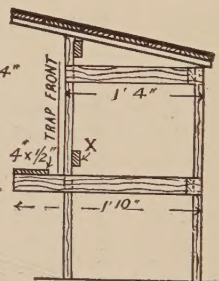
KERO. TIN
FIG. 4

FIG. 3 ELEVATION



SECTION

Plan of a set of four trap-nests.

back. Lay the other two pieces of 4-ft. 10-in on bench 15 inches apart, nail on the two pieces of 2-ft. 4-in., one at each end, and nail on the other three pieces of 1-ft. 3-in. at equal distances, as in Fig. II.; this will form the front. Take the two pieces of 1-ft. 4-in and nail on to

back at the top and on to the front 3 inches from the top; then nail on the two pieces of 1-ft. 10-in., allowing 6 inches to project in front to carry the step (Fig. III.). Then nail on the five pieces of 1-ft. 1½-in. at equal distances, as shown in Fig. III., A, B, C, D, E. To these pieces the kerosene tins, which will form the nests, will be nailed. Cut kerosene tins along dotted lines (Fig. IV.). Remove the small piece at the end dotted round, and cut down 2 inches on each side where indicated by dotted lines. Then cut right down dotted line along top and bend upwards; fit tins into frame and tack sides on to A, B, C, D, E, Fig. III. The piece of tin which has been cut down 2 inches in the front should be bent over the piece of timber marked X in Fig. III. and tacked down. Fix on trap-nest fronts with hinges. Then take six pieces of 4-in. x ½-in. rough lining 5 ft. 3 in. long and nail together with the three pieces of 2-in. x 1-in. 1 ft. 11 in. long; nail this on to nest frame, and cover with ruberoid or other waterproof covering; this roof overlapping gives protection from the weather. The remaining piece of 5-ft. 3-in. lining is for the step.

MARKETING EGGS.

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The mid-February prices for eggs, fixed by the selling agencies in Melbourne, were from 10d. per dozen "ordinary" lots, up to 1s. 3d. for suburban new laid, the market report being as follows:—

Eggs.—Guaranteed lines of hen eggs are in keen demand and light supply. Ordinary lots are offered freely, and meet with a poor reception. Ordinary are quoted at 10d. to 11d., private lots 1s. to 1s. 1d., and new-laid 1s. 2d. to 1s. 3d. Duck eggs are worth from 10d. to 1s. 1d., according to quality.—(*Argus*, 14th February, 1919.)

It will be seen from the above that whereas there is a short supply and a keen demand for eggs—fit to eat—at 1s. 3d., what are termed "ordinary lots" only met "with a poor reception," and were "offered freely" at 10d.

The "ordinary" egg, therefore, as at present consigned to Melbourne is not in its best condition, and some explanation of the circumstances and suggestions for remedy are obviously necessary.

At the present prices of feed-stuffs, 10d. per dozen is not sufficient to pay for the food consumed by all the birds on the farm, and, therefore, allows no margin at all for other expenses, or profit. Whilst the suburban poultry-farmers have their own negligence to thank for the barely payable price of 1s. 3d. (they could quickly remedy the present "market" if they took the obvious course), the up-country farmers are actually losing money.

In hot weather, eggs should be collected twice a day, and kept in a cool place until marketed, which should take place twice a week. At present many are satisfied to gather them occasionally, not always troubling to even hand them over to the storekeeper each time his cart calls. He, in his turn, does not bustle himself to hurry the eggs off to the market, but allows them to accumulate till he has a consignment "worth while" sending to town. As a result, these country eggs arrive in Melbourne often two to three weeks old, and at times are dear enough even at the miserable price they bring.

It is occasionally stated with pride that the poultry industry of Victoria is worth over £2,000,000 a year to the State. Seeing that there are 4,000,000 birds in the State, it should be a source of shame to admit that, in spite of the various world's records that are put up by Victorian birds, *the average production is only 10s. a bird*. Proper care in marketing and a radical alteration of the present "market" should mean 50 per cent. better returns—another £1,000,000 to the State. For the benefit of the country districts, the following recommendations are made:—

Eggs should be marketed unfertile. Roosters are only useful to fertilize eggs for hatching, they do not increase egg-production, and should be removed immediately after the breeding season.

An abundance of clear, cool drinking water should be available for the layers—the egg is two-thirds water, therefore a supply of water is essential. Where water is scarce, renew the supply, however small, several times a day in warm weather.

The water should always be kept in the shade.

Water too dirty for the birds will still help to grow a little green feed.

Nests should always be kept clean, for if they are dirty and verminous the birds will lay elsewhere, and some eggs are sure to be lost.

Collect eggs twice a day in the warm weather.

Store the eggs in a cool place prior to despatch.

Pack eggs for market in odourless cardboard fillers. Musty chaff does not improve the flavour, so add only clean fresh chaff.

Always market twice a week.

Keep the small eggs for domestic consumption; evenly-graded eggs always command the best price.

Get the cases to the station half-an-hour before the train is due to start, otherwise they may be too late, and miss the market.

A satisfied customer is the best advertisement.

